Yosemite National Park

National Park Service
U.S. Department of the Interior

Natural Lightscapes: Dark Night Sky

What is a natural lightscape and why is it important?

A "natural lightscape," such as a dark night sky, is an environment that is undisturbed by light and air pollution. Dark night skies have natural, cultural, and scenic importance. Wildlife is impacted by light pollution because animals often depend on darkness in order to hunt, conceal their location, navigate, or reproduce. For nocturnal animals, light pollution also means habitat disruption. Additionally, many species have far more sensitive vision than humans. Plants are affected by artificial light because it disrupts their natural cycles. Dark night skies are also culturally important because they are a resource common to all cultures on Earth, and are a metaphor for countless myths and religions. They have inspired innumerable works of art, literature, and connections to the cosmos. Natural lightscapes, including dark night skies, are a scenic resource integral to many people's Yosemite experience. Currently, two-thirds of Americans cannot see the Milky Way from their backyard, and if current light pollution trends continue, there will be almost no dark skies left in the contiguous United States by 2025. Many people seek national parks to experience this vanishing resource.

The night sky quality measurements over Tuolumne Meadows indicate near-pristine conditions

What causes light pollution?

Fortunately, unlike topsoil erosion or species extinction, dark night skies are recoverable—it is primarily the result of wasteful and inefficient outdoor lighting. The primary cause of light pollution is artificial light, particularly outdoor lights that are aimed upwards or sideways. Any light that escapes upward without being blocked will scatter throughout the atmosphere and brighten the night sky, thereby diminishing the view of it. Besides spoiling the view and harming wildlife, inefficient lighting wastes energy and creates glare which actually reduces nighttime visibility. Air pollution particles also increase the scattering of light at night, just as it impacts visibility in the daytime.

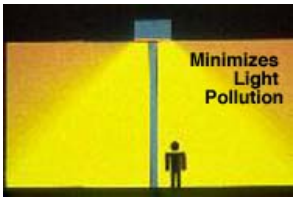
What is the park doing to monitor dark night skies?

To effectively manage any resource, park staff need to determine the current conditions. The National Park Service has developed a system for measuring sky brightness to quantify the source and severity of light pollution. This system, developed with the assistance from professional astronomers and the International Dark-sky Association, utilizes a research-grade digital camera to capture the entire sky with a series of images. The Night Sky Team, formed in 1999, is a small group of NPS scientists dedicated to documenting the status of night skies service-wide and protecting them for future generations. Yosemite is part of a network of national parks monitoring dark night skies to gather a complete light pollution data set. This data sets spans a period from 2001-2005, includes multiple parks, and is collected for 1-6 hours per night on multiple nights throughout the year. Yosemite's data was primarily taken in 2005. Data clearly shows that even remote national parks like Yosemite are not immune from stray artificial light, particularly from the San Joaquin Valley.

What is the park doing to protect dark night skies?

The National Park Service will preserve, to the greatest extent possible, the natural lightscapes of the park. Besides monitoring dark night skies, park staff are developing an Exterior Lighting Guidelines policy to determine what light is appropriate for a location's historic character, energy, cost, maintenance efficiency, light pollution, and wildlife. Efficient lighting is being applied to all new buildings, and older buildings are gradually being converted. The new Curry Village employee housing in Yosemite serves as a model for use of efficient outdoor lighting. The lighting is directed with fixtures to illuminate only what is necessary (i.e. doorways and walkways), thereby preventing glare and light pollution, as well as contributing to added energy and cost savings.

What can I do about light pollution?



- **Experience dark night sky.** First, take the time to enjoy the natural light surrounding you in the park. Consider attending an evening Ranger program under the stars—there are summer evening programs at Glacier Point, Tuolumne Meadows, White Wolf, and Yosemite Valley. Additionally, the park concessioner hosts for-fee "starry skies" programs. As more people live in light polluted areas, viewing dark night skies are becoming a more unique experience. Because Yosemite's night sky is relatively pristine, visibility due to moon and starlight is often quite sufficient without the need for outdoor lighting.

- **Use efficient light in your community.** Efficient outdoor lighting is safer, better for wildlife, more cost & energy efficient, and reduces glare. Use outdoor lighting that meets your basic needs (safety, security, visibility, comfort) only where it is needed. Good lighting fixtures direct light downward to reduce glare and light pollution. Use fixtures that direct all the light where it is needed rather than scattering it in all directions, and utilize motion sensors and timers to insure lights are on only when needed. In darker areas, use less light to prevent disrupting night vision, a security hazard.

Public Participation

Public participation is essential for the success of this and all other park projects. Here are some ways to stay involved in the park:

- **Attend a National Park Service public open house** to talk with project specialists and obtain more information on this topic. Visit the park's planning website (listed below) for upcoming dates.
- **Add your name to the park's planning list** and receive the *Planning Update* newsletter as well as other planning- related notices. You can also submit your email address to receive the park's periodic electronic newsletter.
- **Additionally, you can submit comments with your thoughts about this topic or any other project in the park by any of the following means**:

  Mail: Superintendent
  P.O. Box 577
  Yosemite, CA 95389

  Phone: 209/379-1365; **Fax:** 209/379-1294

  E- mail: Yose_Planning@nps.gov
- **Visit online:** www.nps.gov/yose/parkmgmt/planning.htm *to find out about plans and projects or* www.nps.gov/yose/naturescience/index.htm *to find out about science & nature*
- **For more information on lightscapes and dark night sky**: visit the International Dark Sky Association (IDA) website at www.darksky.org or the National Park Service Air Resources Division website at www2.nature.nps.gov/air/lightscapes